

Comments on USP Honey Identity Standard (FCC FORUM)

June 30, 2020

The US Pharmacopeia Standard for Honey is excellent and essential. This scientific definition will be useful to governments, the legal system, and industry at all levels, including retail and manufacturing, pharmaceutical, cosmetic and food services.

This important work conforms to the Apimondia Statement on Honey Fraud, and enhances its credibility. During the past decade, scientific investigations and direct observations have revealed that there are multiple modes of economically motivated adulteration (EMA) which have plagued the international honey industry. These multiple modes of adulteration creating pseudo or fake honey allow adulterated honey to be produced with no ceilings to quantities and no floors to prices. It is due to that reason that the prices for authentic, pure honey have collapsed, and as Prof. Michael Roberts has accurately described it: “Beekeepers have become an endangered species.”

The value of this Standard is very clear given the well-known fact that industries plagued with adulteration have such inconsistent and conflicted interests that they can never, without external compulsion, comprehensively and effectively police themselves. This is even more important in a context of massive and rampant honey adulteration, created when modes of adulteration become both diverse and sophisticated.

As Prof. Michael Roberts recommended to the industry, in his 2017 report “Recommended Strategies to Address Economic Adulteration of Honey,” the US Pharmacopeia can play a vital role in establishing standards that are science based and relevant to solving the real world phenomenon of adulterated honey. That problem has plagued beekeepers throughout the world and harmed honest actors who will not indulge in food fraud.

Regarding Production of Honey, of particular note is the imperative to preclude the extraction of immature, unripened high moisture honey whose chemistry is more like that of nectar than that of honey. This mode of extracting honey quadruples quantities, collapses cost of production, and allows the market to be flooded with immature honey, with which authentic honey cannot compete. This practice, which originated in Asia, particularly in China, prevents the bees from fully interacting with nectar or other plant secretions to produce the complex product which is natural honey. This interaction is a fundamental and cardinal feature of honey which is recognized by Codex and Apimondia. Prof. Enrique Bedascarrasbure, world expert on the production of honey in tropical countries, has made it clear that tropical and semitropical countries can and should produce mature, fully ripened honey. It is also clear that with these very important standards from the US Pharmacopeia, beekeeping practices throughout the world both can and should be improved. The fact that such improvements in beekeeping practices remain to be fully effected and perfected points to the need for science based standards to guide

the elimination of poor practices and establishment of good practices. Leading beekeeping associations in America, the World Honey Congress, Europe, and South America are already addressing this necessity.

The Description “Honey...including pollen” conforms to a long standing trade practice in the U.S. and other countries. Using it with integrity is crucial for promoting the diversity, quality and authenticity of honey. It is important to prevent consumer fraud on one hand, and important for attracting consumer interest through creative marketing of honey. The U.S. government and private companies have for many years used pollen tests (mellissopalynology) for authentication of botanical and geographic origin for confirmation of primary honey. Pollen is not to be artificially added to nor removed from primary honey. When pollen is removed, then commercial integrity compels that it be properly indicated so that the consumer knows. Also, added pollen should be labeled as such.

The Botanical and Geographical and the Foreign Sugars sections reference use of Nuclear Magnetic Resonance testing (NMR). Some countries have been compelled to adopt NMR but they are using it in a limited way that gives partial results. NMR tests can contrast nectar profiles with honey profiles, which profiles are quite different. They can also reveal the illegal use of resin technology on honey and as well as the pervasive practice of the extraction of unripe, immature, non-authentic honey. The latter practice is common in several Asian countries and, as Prof. Enrique Bedascarrasbure’s work on honey in tropical and semitropical countries demonstrates, it is not necessary but a result of poor beekeeping practices. The importance of fully ripened honey has been illustrated this August, 2020, by a posting on the prominent website apiservices.biz. The post describes methods used by honey exporters in China and other Asian countries, which are inconsistent with and violate Codex Alimentarius. Asian honey exporters told the French beekeeper that he should work like them, using premature extraction to multiply his yields, which they found ridiculously poor. The exporters explained that they destroy all the yeasts with high technology, and use malt syrups which are sold at \$0.20/lb. The French beekeeper said that what you are producing and selling is not honey.

The use of resin technology has two manifestations within the phenomena of honey fraud. Resin technology has been used to change colors from dark to light, and remove offensive flavors. Also residues have been removed which allow for labeling conventional honey as organic. The USDA has recently raised concerns about fraud in the labeling of organic foods.

It is important to keep a strong pollen requirement, which can be modified relative to botanical sources because the use of resin technology that serves other modes of fraud removes pollen. It has been witnessed that pollen has been deliberately added to honey which has been either ultra filtered or treated with resin technology in Asian factories.

The Apimondia Statement on Honey Fraud identifies main modes of honey adulteration plaguing the international honey industry. None of these modes can be ignored.

As work done by scientists and mathematicians in the FDA on a Research Protocol for the Global Supply of Honey along with scientific work with Dr. Joseph Bowden, have made clear, the integration of 1) a comprehensive global database of honey samples and 2) the use of modern computing capacities make it possible to effectively and accurately discriminate adulterated from authentic honey. Similar databases prepared for other food products, such as wine, are also being successfully established and effectively utilized to distinguish adulterated from authentic products.

Science must continually progress. There are two areas that must be addressed in future work. Those areas are

- I. Further articulate the chemical constituents, and the variables which determine those chemical constituents, of authentic honey. Those variables include botanical source, geographic origin, extraction procedures, weather, atmospheric conditions, production techniques and storage.
- II. The issue of tolerance levels for residues. Honey does not exist in a realm of ultrapurity. Since zoological and botanical life forms are vulnerable to various diseases, and have to be protected to guarantee global food security, residues are inevitable. Contaminants from Chinese coal factories have been found atop the Canadian glaciers in the Canadian Rockies. Similarly, glyphosate has migrated through wind and rains. Science based tolerance levels are necessary for all foods, including honey. The science based assessment of both risks and, as is the case with honey, health benefits, requires reference to average daily intake (ADI).

I recommend that among future topics for the US Pharmacopeia, in its work on honey, these 2 topics be included.

A particular topic of investigation concerns the ratios and sugar profiles of different honeys. For example, trees that have been used for the production of wood, such as acacia and locust trees, and also some bushes such as sage bushes, naturally have very different ratios among their sugars than do many other botanical sources, whether clover, orange, apple, canola, etc.

Elaboration on the minor aberrations in sucrose content resulting from winter/early spring feeding or feeding between crops deserves additional attention. Such is outside the realm of economic adulteration, and reflects the need of beekeepers to keep their bees alive when foraging is limited or impossible.

Conclusion

I congratulate the USP on this great achievement, which came from the deliberation over an extended period by a panel of international experts. We should not weaken this standard in any way. The US Pharmacopeia can and should act with independence that transcends “industry standards,” which may reflect the interests of those engaged in food fraud and economically motivated adulteration. We have entered an era in which consumers are demanding authenticity, retailers and manufacturers are keen to exercise their corporate social responsibility and governments are more interested in maintaining the integrity and the security of the food supply.

I recommend, if possible with USP protocols, that all of the members of the US Pharmacopeia honey panel are listed, so that the readers know the expertise that has been brought to bear in creating this Standard. This is normative for scientific and official research papers and proposals. I think it would enhance the strength and credibility of the document.